BIOME

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Up on the Roof

New hope for the preservation of endangered birds was kindled in late September 1987 when bird-watchers at the Richmond Sewage Lagoon near Ottawa spotted a pair of Peregrine Falcons swooping and diving among the shore birds. One of the falcons, a female, wore a special band.

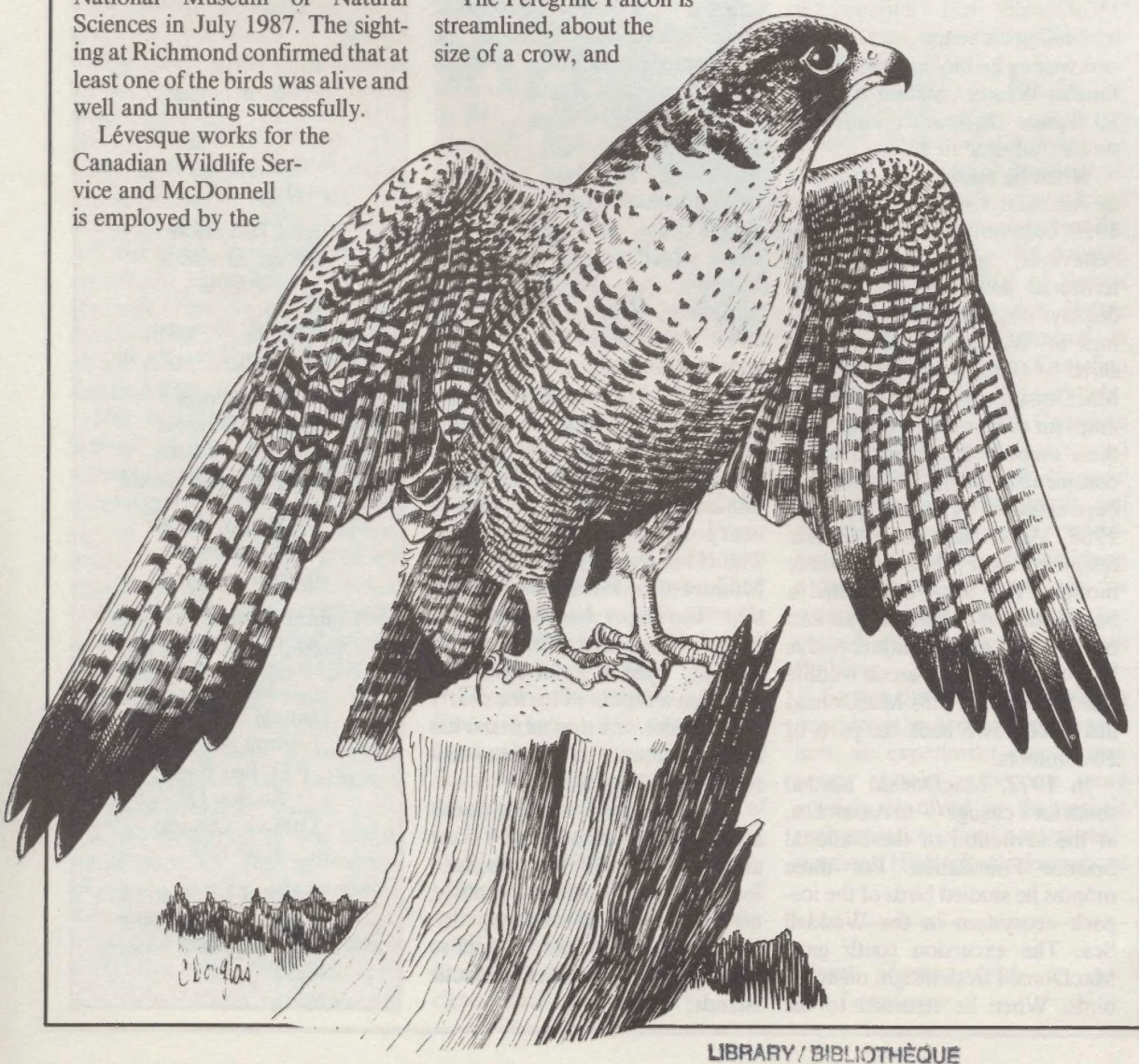
To biologists Hélène Lévesque and Jan McDonnell, this was welcome news. The band identified the bird as one of the four captive-raised falcons they had released from a cage on the roof of the National Museum of Natural Sciences in July 1987. The sighting at Richmond confirmed that at least one of the birds was alive and well and hunting successfully.

Lévesque works for the Canadian Wildlife Service and McDonnell is employed by the Ontario Ministry of Natural Resources. The Wildlife Service and Ministry are involved in a cooperative project to re-establish the Peregrine Falcon in the National Capital Region. Besides the four Museum falcons, 11 others were set free in July in Nepean.

For centuries, the Peregrine Falcon's astonishing speed and skill made falconry the sport of kings. The Peregrine is the fastest flying bird in the world, diving at speeds of almost 300 km/h, and killing its prey in mid-air with its powerful taloned feet.

The Peregrine Falcon is streamlined, about the size of a crow, and has a tawny spotted breast, slate-grey back, long, pointed, spotted wings and barred tail. The birds released from the Museum roof were *anatum* Peregrines — the rarest of three subspecies found in Canada. There are only 15 occupied territories in southern Canada.

Because they are at the top of the food chain, birds of prey are very vulnerable to pollutants. DDT — a pesticide used in the 1960s and now banned in North America — made falcon eggs so fragile they collapsed under the weight of the incubating parent.



Wayne Cuddington, The Ottawa Citizen

"A project of hope." Besides the four Museum falcons, 11 others were set free in July 1987 in Nepean.

By 1971, the Peregrine Falcon was extinct in many parts of the world. It was declared an endangered species in Ontario in 1974. Since 1977, the Ontario Ministry of Natural Resources has been working with wildlife organizations to bring the Peregrine back.

Over the past 12 years, 62 falcons have been released in the National Capital Region, but so far no breeding pairs have survived to rear young. In 1983, a pair of *anatum* Peregrines took up residence in an Arnprior church steeple. Their courtship ended in tragedy when the female was shot. The male still returns to look for its mate.

Lévesque admits that such failures are discouraging but McDonnell, who has been involved with the release program in Brockville for three years, says "This is a project of hope."

The majority of chicks for the restocking program are bred at the Wildlife Service's falcon hatchery in Wainright, Alberta. Eggs produced by captive breeding pairs are carefully incubated and the chicks tended until they are one month old.

The fledglings are then sent to new homes across the country and prepared for release. About 100 were set free across Canada last summer.

Four of the young birds were installed in a "hack box" on the roof of the NMNS. The hack box was specially designed to isolate the falcons from human beings while they became accustomed to the new environment that they saw through the bars of the box. The birds were fed quail through a chute, and never saw their human hosts. If captive-raised falcons are to fend for themselves, they must never make the connection between people and food.

However, thanks to Wackid Radio, which supplied the equipment, visitors to the Museum could watch the baby falcons on closed-circuit television in the *Birds in Canada* gallery on the second floor. The fluffy white chicks with their fierce black eyes and hooked beaks were a great hit with the public, Lévesque says. "We had a lot of questions to answer. People have been very curious about and supportive of the program."

As their flight feathers emerged, the birds began to exercise their wings. At the end of July, the cage was opened.

It was a tense moment, Lévesque says. One bird flew out immediately; the other three waited until the next day. For the next month

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National Museums of Canada Musées nationaux du Canada

Canada

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or so, the young falcons hung around the Museum, perching on trees and nearby buildings.

Mishaps occurred as the young falcons were learning new skills. At the Museum, one bird encountered difficulties during a bad storm. Luckily, the stunned bird, which could not take off from a nearby street, was rescued by a passerby and, with medical attention, recovered completely. (Anyone who finds an injured Peregrine should call their provincial wildlife agency or the Canadian Wildlife Service.)

The capital area is a good place for a young falcon to make its debut. There are lots of fat pigeons to eat, and not too many Great Horned Owls — the traditional enemies of young falcons.

Even so, Lévesque and McDonnell know they may never see their "foster" falcons again. The young birds have only a 20 to 30 per cent chance of making it through their first year.

Besides marauding owls, the greatest threat to the falcons comes from people — indiscriminate hunters, polluters and smugglers. (Peregrine Falcons are highly prized in the Middle East where they can sell for over $25,000.) Falcons that live in cities may be attracted to dangerous perches — two falcons were killed on hydro towers in Nepean last summer.

Peregrine Falcons migrate south each winter. If the Museum falcons survive, they may eventually return to set up housekeeping on the roof. Whatever happens, more falcons from Wainright will be released in the capital area this summer.

Lévesque says it is always hard to let the birds go. "But it's better to see those birds fly free than to just have a few of them left in cages."

Cecilia Blanchfield

Nature on the Move

National Museums of Canada

*A life-size model of a carnivorous dinosaur (**Stenonychosaurus inequalis**) is featured in the "Building a Dinosaur" travelling exhibit.*

No matter where you live in Canada, if you're a nature lover, the National Museum of Natural Sciences can visit you!

If your city or town has a museum, zoo, art gallery, exhibition centre, library, or other institution, our Museum may be able to provide a travelling exhibit for display.

Exhibits are as small as ten original oil paintings, or as big as life-size dinosaurs. They include everything from specimen samples from the National Collections to interpretive programs and resources like videos and computer games.

Many natural history subjects are featured in our travelling exhibits. Bats, whales, dinosaurs, nature art, minerals, birds, flora and fauna of the Canadian North, and climatic change are but a few examples of travelling exhibit themes. Through them, you'll "sneak a peek" at the collections, research and interpretive expertise of the National Museum of Natural Sciences.

Exhibits are loaned for periods of four to eight weeks, travelling across Canada several times during their two- to five-year tour. Borrowers pay a loan fee for each exhibit, covering transportation and insurance costs.

Currently, the National Museum of Natural Sciences has ten travelling exhibits in circulation. Over fifty Canadian institutions are regular borrowers and have reserved travelling exhibits into the 1990s.

Since the program's inception in 1973, over sixty travelling exhibits have been produced and made available to Canadian institutions. Nine of these have toured internationally. From Pointe-à-Pitre, Guadeloupe, to Athabasca, Alberta, young and old have experienced the wealth of Canadian nature through travelling exhibits.

If you would like to see a travelling exhibit of the National Museum of Natural Sciences in your town, have your local museum, library, gallery, etc., write us for more information:

National Museum of Natural Sciences
Travelling Exhibits Coordinator
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Barbara J. McIntosh
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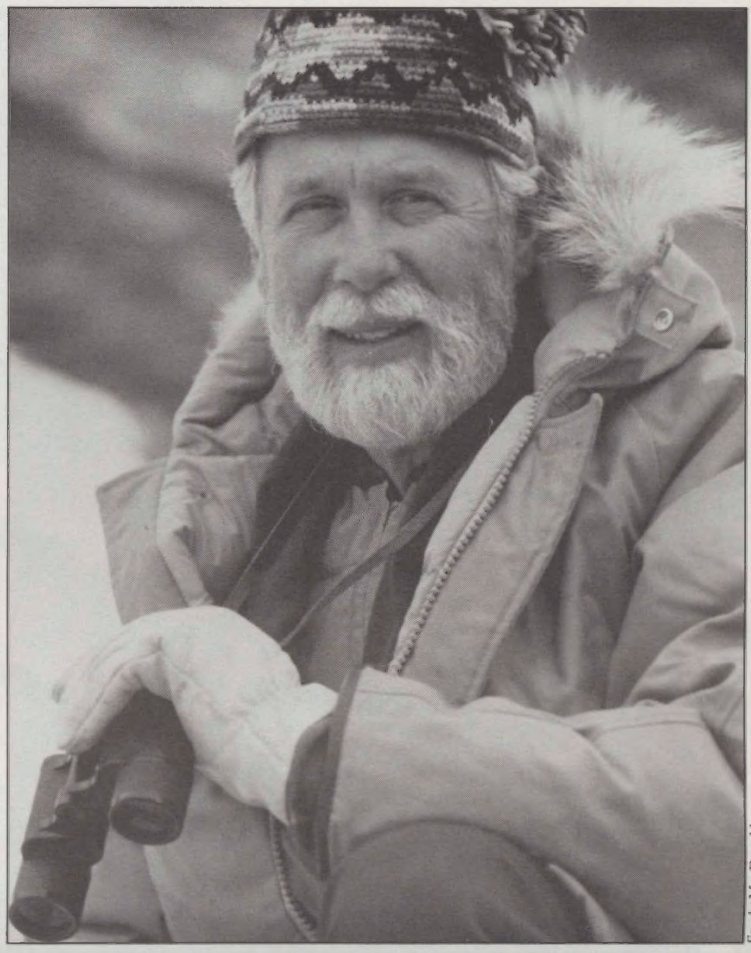
Museum Profiles: Stewart D. MacDonald



Sandy MacDonald

Last August, Stewart MacDonald, NMNS Curator of Vertebrate Ethology, was honoured by the Canadian Council on Ecological Areas for his 18 years of efforts that led to the establishment of the first National Wildlife Area in Canada's Arctic. MacDonald's major contributions to knowledge and conservation in the Canadian north also earned him the Distinguished Service Award from the Federation of Ontario Naturalists in 1985, and an Honorary Life Membership in the Ottawa Field-Naturalists' Club in 1984.

Forty years ago, at the age of 20, MacDonald left his native Nova Scotia to work as a technician for the National Museum in Ottawa. In 1949 he joined a small expedition to Prince Patrick Island in the Arctic Archipelago. Here, he discovered the lure of the "Far North."

He returned to the Arctic several times over the next five years, taking part in the first detailed studies of the ecology and distribution of northern breeding birds. "We always flew with the fuel tanks topped up," recalls MacDonald. "We were often without information about the weather where we were going, and there were few places that you could land."

During these years, MacDonald had gone back to school on a part-time basis and was juggling a busy research schedule with academic work. Field seasons often lasted from mid-March to mid-October, which created some problems. MacDonald had difficulty in scheduling his exams, and remembers writing his biology finals at the Eureka Weather Station north of 80 degrees. He resumed university studies full-time in 1956.

When he rejoined the Museum as Assistant Curator of Birds in 1959, he began research on animal behaviour, specializing in the territorial behaviour and mating displays of grouse. The line drawings in W. Earl Godfrey's *The Birds of Canada* (1966) were by MacDonald, as were the range maps for every species. On most of these maps Bathurst Island was a conspicuous blank, as it had never been explored by zoologists. So, in 1968, MacDonald led a six-man research team there for three months. The team established a field station at Polar Bear Pass and began the first comprehensive long-term studies of arctic wildlife (see *BIOME* Vol. 7:3). MacDonald has since flown back for parts of 18 summers.

In 1972, MacDonald headed south for a change — to Antarctica, at the invitation of the National Science Foundation. For three months he studied birds of the ice-pack ecosystem in the Weddell Sea. The excursion south gave MacDonald fresh insight on arctic birds. When he returned to the North the following year, he established new nesting records for the rare Ivory Gull based on his observations of several species of petrels in Antarctica.

MacDonald had long since realized the fragility and uncertain future of Polar Bear Pass. His concern for the Arctic led him to ask the UNESCO-based International Biological Programme to designate the valley an area of special ecological significance. He also wanted to reach the public and the politicians. "I was determined to get people down south to look at the Arctic as something other than desolation," says MacDonald. In 1976 he assembled a stunning show of his photographs, *An Arctic Oasis*, which has since become the Museum's most popular travelling exhibition. The success of *An Arctic Oasis* pleased MacDonald and the exhibition resulted in thousands of people writing letters to show their support for the preservation of Polar Bear Pass.

In 1986, MacDonald's determination finally resulted in permanent protection for Polar Bear Pass. The Honourable Tom McMillan, Minister of the Environment, noted that "The major share of the credit goes to Stewart MacDonald. The Wildlife Area at Polar Bear Pass has been a dream of his for nearly two decades, and the fact that it has become a reality owes a great deal to his unceasing efforts."

MacDonald emphasizes that this is just the beginning since 70 other arctic sites have also been proposed for protection. "In the next century, are we to be judged for our apathy, our avarice or for our wisdom in planning for the future of the Arctic Islands?"

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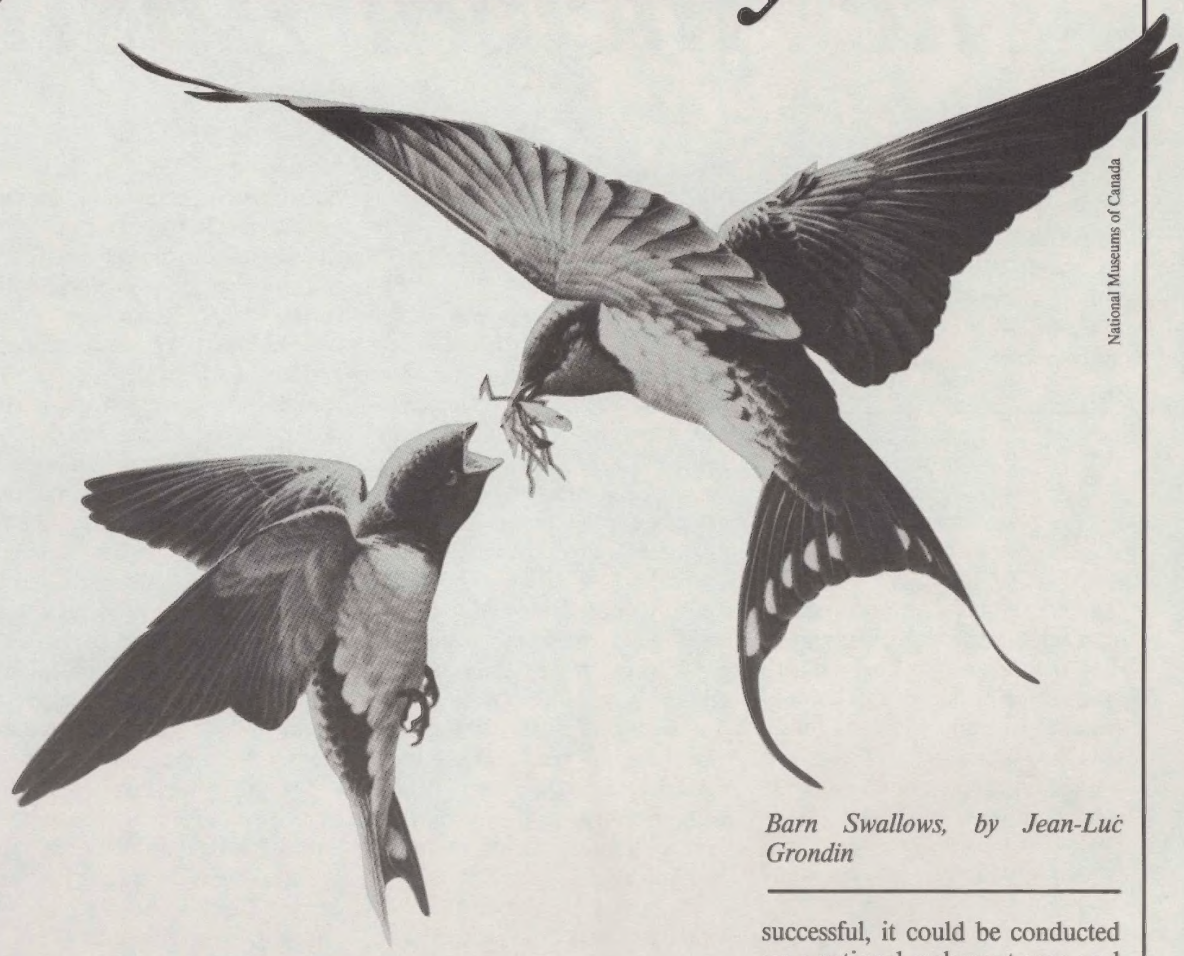
Nature Art: a Priority or a Luxury?

American Museum of Natural History, NY

Canada Geese, by John James Audubon



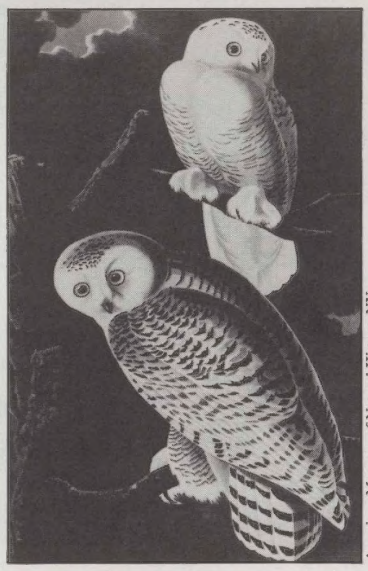
National Museums of Canada

Barn Swallows, by Jean-Luc Grondin

What can nature art contribute to museology in Canada? What directions should museums take to promote this form of artistic expression and make it accessible to the public? These and many other equally important questions are especially timely at the National Museum of Natural Sciences: until April 10, the Museum is presenting *Science into Art*, an exhibition produced by the American Museum of Natural History of New York in honour of the 200th anniversary of the birth of renowned nature artist John James Audubon.

Nature art has gained its stature largely because of Audubon's remarkable endeavours and the immeasurable influence of his work on our knowledge of ornithology today. His first exhibition of North American birds at the Royal Institute of Edinburgh in 1827 was, without a doubt, a critical turning point: art was recognized for the first time as serving a useful role in the discovery of nature. His paintings of life-size birds, portrayed in their natural habitats, became a source of public fascination.

The publication of his monumental book, *The Birds of America*, inevitably led many other artists to follow in his footsteps, such as Archibald Thorburn and Joseph Wolf in Britain; Francis Lee Jacques and Louis Agassis Fuertes in the United States; Léo-Paul Robert in Switzerland; Wilhelm Kuhnbert in Germany; Bruno Liljefors in Sweden; Carl Rungius and Allan Brooks in Canada. Their contributions to today's growing environmental awareness are indisputable.



American Museum of Natural History, NY

Snowy Owls, by John James Audubon

Despite the always limited financial means at its disposal, the National Museum of Natural Sciences has sought over the years to support the visionary work of such pioneers. As early as 1842, William E. Logan was commissioning artists for illustrations of wild animals needed for scientific publications. In 1934, Allan Brooks illustrated Percy A. Taverner's classic *Birds of Canada*.

In the early 1970s, under Director Louis Lemieux, the Museum expanded considerably its collection of nature art. This collection now has over 1000 works, including several prints by Jean-Luc Grondin, watercolours and paintings by Ghislain Lefebvre, sculptures by Robert Kerr and David Wong, and other works by Robert Bateman, Ely Kish and Dagny Tande Lid. In 1980, Domtar Inc. donated some 90 watercolours by James Fenwick Lansdowne. In 1982, following Domtar's example, M.F. Feheley bestowed upon the Museum 40 other watercolours by the same artist from his personal collection.

The Museum is devoting an enormous amount of energy to promoting the development of nature art and enhancing its visibility. In 1982-83, it produced two important travelling exhibitions: *Images of the Wild*, devoted entirely to the works of Robert Bateman, and *Canadian Nature Art International*, organized in conjunction with the Canadian Nature Federation, and highlighting several renowned Canadian nature artists. In 1986, it presented *The Illustrated Bird in Canada: 300 years of books, prints and paintings*. The Museum is considering the possibility of establishing a gallery reserved specifically for nature art, once it acquires the entire Victoria Memorial Museum Building.

Earlier this year, the Museum organized the *Arctica Art* competition, an experiment encouraging young people to become more actively involved in the artistic representation of our natural environment. High schools throughout the National Capital Region were invited to participate. The artist whose work is judged the best will be offered a trip for two to the Canadian Arctic, compliments of First Air. If the competition is successful, it could be conducted on a national scale next year, and could be a catalyst in the creation of a new generation of Batemans, Lansdownes and Grondins.

National Museums of Canada

Great Horned Owl, by J.F. Lansdowne

Hélène A. Desfossés
Public Services Division

Eucalyptus: The Ancient Australian

Editor's note: Dr. David M. Jarzen of the NMNS Paleobiology Division is currently a Visiting Scholar at the University of Queensland, Australia. This is the first of his impressions from "down under."

Visitors to Australia are soon struck by the fact that two plant genera, *Eucalyptus* and *Acacia*, are the most dominant features of the country's landscape. The eucalypts in particular are so characteristic of Australian vegetation that it is nearly impossible to discuss the history of this country without mention of this beautiful and fascinating group of trees.

The eucalypts are a very large genus of trees belonging to the myrtle family (*Myrtaceae*), with all but a few of the approximately 600 species confined to the Australian continent. Seven or so species extend beyond Australia to New Guinea and scattered islands of the south Pacific.

Eucalyptus trees are majestic and often massive, reaching heights of 30-50 metres, and may form dense or scattered stands in open forest and woodland. Only a few species have been successful in rainforest margins and alpine habitats. Some giants, such as the Mountain Ash (*Eucalyptus regnans*) of Tasmania, towering at 100 m, are the tallest species of broad-leaved trees in the world.

The flowers, which range in colour from shades of creamy-white to yellow through many shades of pink and red, have given the eucalypts not only their name, but their distinctive and characteristic features which facilitate recognition. Unlike most flowers, those of the eucalypts lack petals and green sepals, possessing instead one or two green caps known as opercula (see illustration). The opercula protect the delicate male and female parts of the flower and are shed when the flowers mature and are ready for pollination and thus fertilization. The flower parts are therefore well hidden until maturity, a fact reflected in the name *Eucalyptus* which is derived from two Greek words, *eu* (well) and *kalyptos* (covered).

The evergreen leaves of eucalypts are varied in size, shape, venation and orientation on the tree branches. Some are held vertically downwards and display little difference in the colour and texture of the two surfaces. Other leaves may tend towards a more horizontal or erect growth and show a marked difference in colour between the two surfaces. The most common leaf form is long, slender, and shaped like a lance head (see illustration).

*Fertile branch tip of **Eucalyptus** sp. showing flowers (top), capsules with opercula (middle), and mature fruits (bottom).*

David M. Jarzen, Paleobiology Division

*Trunk detail of a gum-bark species of **Eucalyptus** showing the deciduous bark layer.*

Bark types and patterns in *Eucalyptus* species are likewise varied, yet characteristic of major subgroups of the genus. Bark features may be smooth, peeling, stringy, deeply furrowed, scaly or a combination of some of these features. Perhaps the most easily recognizable bark pattern is the deciduous (shedding seasonally) type of the "gum barks." The bark of these species does not crack and expand as the tree grows in diameter, but eventually splits into larger or smaller flakes or strips and is shed from the tree, allowing a new layer of bark to form below. The continuous shedding of older bark layers is a unique and "artistic" feature of the gum bark species (see photograph).

Eucalypts were collected and described by the naturalist Sir Joseph Banks and his assistant Dr. Carl Solander during Captain James Cook's historic Pacific voyages on the *Endeavour* (1770-1771), which led to the settlement of Australia's eastern coast by Europeans. Both botanists noted that certain species of eucalypts exuded a "gum-like" substance and, like others before them, called them "gum-trees." To this day the term "gum-tree" has persisted for several species of eucalypts even though the name is truly a misnomer.

The word *gum* should be applied only to water-soluble substances of carbohydrate composition. Eucalypts produce "kino," a resinous exudation which contains tannins. The precise biological function of kino is not well understood; however, its presence is associated with insect attacks, storm and fire damage. Perhaps it is a method by which the trees attempt to heal damaged or wounded areas.

The history of Australian flora is largely the history of the genus *Eucalyptus*. Fossil pollen of eucalypts, which is approximately 30-35 million years old, has been recovered from rocks of the Oligocene epoch. Paleobotanical evidence and detailed studies of living eucalypts suggest that the group evolved from several, now extinct, ancestors. This fact may in part account for the wide variety of leaf, flower and growth patterns preserved in the 600 or so species now living in Australia.

Economically, the eucalypts are very important as a source of lumber. The trees have provided Australia with the richest source of hardwoods in the world, and they offer some of the heaviest, hardest and most durable woods known. The wood is not only used as lumber for construction but is a valuable source material for the production of paper, pulp, fibre board, veneers, plywood and wood-distilled products. The bark provides vegetable-tanning materials, while the leaves provide unique essential oils which have valuable pharmaceutical and industrial uses. The flowers provide Australia's principal source of honey. The flowers and fruits of some species of eucalypts provide food for the Australian Aboriginals, and their softer tissues can also be a source of water.

The eucalypts are native and ancient Australians. In fact, one species, the Coolabah (*Eucalyptus microtheca*), has been honoured as the tree under which the "Jolly Swagman" sat in the legendary Australian ballad "Waltzing Matilda."

David M. Jarzen
Paleobiology Division

Feathers

Did you know that feathers probably evolved as a temperature control device from scales much like those of modern reptiles? That feather colour and shape can be used to determine the age or sex of birds? Or that of all Canadian species, the Ruby-throated Hummingbird has the smallest number of feathers (940), and the Tundra Swan the highest (25,216)?

You would have known these facts if you had read *Feathers*. This new issue of *Neotoma* written by Dr. Henri Ouellet, the Museum's Curator of Ornithology, deals with many intriguing aspects of these complex structures unique to birds. For example, some very specialized feathers may not resemble feathers at all, such as the powder down feathers of herons, which produce a fine powder used in the maintainance of other feathers.

Want to find out more? Then call or write to the Museum Information and Resource Centre for your free copy of *Neotoma* no. 21, *Feathers*. A list of our other free materials is also available upon request.